

Tilburg University

Rational Pensions for Irrational People

Prast, Henriette; Bodie, Z.

Publication date:
2011

Document Version
Publisher's PDF, also known as Version of record

[Link to publication in Tilburg University Research Portal](#)

Citation for published version (APA):
Prast, H., & Bodie, Z. (2011). *Rational Pensions for Irrational People: Behavioral Science Lessons for the Netherlands*. (Netspar Discussion Papers; Vol. 09/2011-076). NETSPAR.

General rights

Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying the publication in the public portal

Take down policy

If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

Netspar DISCUSSION PAPERS

Zvi Bodie and Henriëtte Prast

Rational Pensions for Irrational People

Behavioral Science Lessons for the Netherlands

Rational Pensions for Irrational People

Rational Pensions for Irrational People:
Behavioral Science Lessons for the Netherlands

by

Zvi Bodie

Norman and Adele Barron Professor of Management, Boston University, US

and

Henriëtte Prast

Professor of Personal Financial Planning, Tilburg University, and Member of the
Scientific Council for Government Policy, The Netherlands ♦

Abstract

This paper examines some of the main behavioral patterns that determine personal saving, investment, and retirement decisions, and considers ways to move them in a socially desirable direction. We pay special attention to factors contributing to people making choices that are not in line with their preferences. We present empirical evidence from other countries and consider their implications for proposed changes to the system in the Netherlands.

The paper makes various suggestions for improvement regarding both the institutional design and product design for pension saving in the Netherlands that could be adopted in the context of recent proposals for a structural change of the pension system. In doing so it pays attention to both occupational pensions (“the second layer”) and pensions for the self employed. A comparison is made with the recommendations of the Goudswaard Committee.

1. Introduction

This paper argues that the pension system in the Netherlands should use insights from behavioral economics as well as financial technology when making the necessary changes for a sustainable pension scheme. Starting with Kahneman and Tversky (1979), behavioral scientists have convincingly demonstrated that many – perhaps most—people make serious cognitive mistakes that are systematic and predictable. In saving, investing and insuring for retirement, some mistakes can have very damaging consequences for these people and for society at large. In this paper we analyze the most consequential of these mistakes, and we consider possible public policies to correct them or adapt to them. We focus on the Dutch context, drawing lessons from other countries where appropriate. We argue that it is the responsibility of institutions, including the government, employers,

♦ The authors would like to thank Richard Fullmer, Kent Smetters, Jan Snippe, Lans Bovenberg, Casper van Ewijk, Ed Westerhoud, Jan Potters, two anonymous referees and the participants of the CPB-Netspar conference in The Hague in October 2010, for their comments on an earlier version of this paper; the usual disclaimer applies

and pension funds, to guide people in realizing adequate financial planning. We add to the existing literature by proposing the use of sensory defaults in both the second pillar and in retirement saving for the self employed, and by arguing that employees should get limited choice not in input (portfolio) but in output (real living standard).

Throughout the industrialized world, pension systems are becoming unsustainable in their current form. They must adapt to longer life expectancies and a predictable increase in the ratio of benefits to contributions. Unless retirement investments can be made to yield higher rates of return, pension systems can be fixed only by lengthening working lives or increasing the rate of saving for retirement. The biggest obstacle to making the necessary changes in the system is wishful (even magical) thinking by the people directly concerned: the tendency to pretend that the problem does not exist or that some powerful entity – the government, the trade union, the employer, or some other organization – will take care of it at little or no cost to them personally. Wishful thinking must be replaced with pragmatism. People must be made to understand and accept the need to save more, postpone retirement, or both.

In the U.S. and the U.K., businesses that in the past have sponsored pension plans are shifting the responsibility to individuals. Investment companies, insurance companies, and other financial service firms have responded with products and advice that have been hard for consumers to understand or trust. In the Netherlands the same demographic factors and behavioral patterns are creating a need to induce people to save more or postpone retirement. It has also been suggested that plan participants should bear more risk, and that guarantees should be reduced. In order to help citizens make sound decisions, institutions in the Netherlands are focusing on financial education and providing better pension information. Will this effort succeed? What can be learned from the experience in the U.S.? What other approaches based on sound behavioral science might work?

The paper is organized as follows. In the next section, we briefly describe the Dutch pension system and the challenges facing it now. In section 3 we present the relevant behavioral findings about life-cycle saving and investing. In section 4, these behavioral lessons are applied to the Dutch system and are used to assess current policy and to make suggestions for improvements. Section 5 summarizes and concludes.

2. Retirement plans in the Netherlands: a birds' eye view

The typical employee in the Netherlands has a career-average defined-benefit pension. During the active working period accrued pension rights are still indexed to negotiated wage increases. However, full indexation of pension claims to cost-of-living increases is

Rational Pensions for Irrational People

not guaranteed, and even nominal “guarantees” are conditional on the coverage ratio of the pension fund meeting the government’s minimum requirement. Hence employees are somewhat exposed to asset market risk.

The 2008 global financial crisis has made clear to policymakers that the current system -- even with the changes introduced earlier in the decade -- is unsustainable. Even those who support the social goals of the system point to some fundamental problems that have to be addressed. Changes are unavoidable.

Two committees of experts have produced reports and recommendations for reform. The Frijns committee recommended to replace the current focus on the nominal funding ratio by a framework in real terms (Frijns, Nijssen and Scholtens, 2010). The Goudswaard committee concluded that either the target pension benefit level should be lowered, or workers should accept a higher risk of not reaching it. At any rate, it should be made clear to participants what risks they are bearing (Goudswaard Committee, 2010).

The latest reform proposals have tackled the issue of raising the age of eligibility for the first layer of pension benefits -- social security. In 2010, employers and employee organizations launched a plan to make changes to the current system in order to make it sustainable (Stichting van de Arbeid, 2010). As for the first layer, the organizations have proposed increasing the eligibility age for the first layer starting in 2020. For the second layer they have reached an agreement to shift more of the cost from younger to older employees by putting a ceiling on premiums and reducing the level of guaranteed benefits.

Another challenge in the Netherlands is the growing group of self-employed who are not covered by an occupational plan - indeed, pension coverage among the self-employed is rather low. There are pension funds for traditional groups of independent professionals (by category, for example for specialized doctors), and all professionals are required to become a plan member if 60% of the profession agrees. However, there is no equivalent for the new self employed who as a group are very heterogeneous and do not belong to a professional organization (as compared e.g. to the traditional “guild”). This group is growing quickly for a number of reasons (Van der Lecq and Oerlemans, 2009; De Jong, 2009). Digital technology and the Internet enable individuals to start a company from their “kitchen table” at low cost. Working mothers prefer the flexibility of their own business to the rigidity of being an employee. Employers like to hire self-employed ad hoc in order to have flexibility and avoid the contractual rigidity associated with hiring employees. In 2009 the estimates of the self employed vary (depending on the definition) between 250.000 and 810.000, out of which the majority has no employees and hence runs

its own business on its own. In 2007 the largest trade union in the Netherlands foresaw an increase with 50% within ten years (FNV, 2007)

2. Behavioral economics findings

With his remark that “God must love those folks that behavioral scientists write about because She created so many of them,” the late Paul Samuelson underscored that the people described by behavioral economists are the rule, not the exception (Samuelson, 2006). Core findings in psychology and economics are that both in experiments and in the field people consistently deviate from the rational choice model in all of the following respects: they have nonstandard *preferences*, nonstandard *beliefs*, and exhibit systematic and predictable biases in decision making.

Several excellent recent surveys of the behavioral economics literature have been published; see for example Camerer (2006) and DellaVigna (2009). The aim of this section is therefore not to provide a comprehensive review; instead, we focus on those behavioral economics findings that provide lessons for the Dutch pension system.

For the subject of this paper, non standard time preferences, and biased decision making are especially relevant.

As for *nonstandard time preferences*, the findings on self-control problems suggest that the discount factor in intertemporal choice is time-inconsistent. Under standard exponential discounting the relative utility of A over B in period t does not differ according to whether it is evaluated in period t or any other period $t - k$. Under hyperbolic discounting, the utility of A as compared to B does differ according to the time between the period of evaluation and the period of “consumption”.

As for *biased decision making* in the pension domain, the status quo bias, default sensitivity, omission-commission bias and the distortive effect of complexity on choice are particularly relevant.

Beshears, Choi, Laibson and Madrian (2010) identify 5 circumstances that make it likely that revealed preferences – tastes that rationalize observed actions – do not correspond to normative preferences – what people would like to choose/should choose, given their preferences. These circumstances are the following:

- a) There is intertemporal choice with an immediate gratification option
- b) Choice is complex
- c) Passive choice (a “silent consent” option)
- d) Limited experience/little opportunity to learn from mistakes

e) Third parties take advantage of psychological biases of their clients

In the field of personal finance in general, and in that of saving and investing for retirement in particular, these factors play a prominent role.

In addition to these circumstances, there are other behavioral biases and inconsistencies that are relevant for the domain of retirement. Inconsistent risk preferences (notably, myopic loss aversion) may lead to a portfolio that is not risky enough given long run risk preferences, while the “gospel of stocks” – the conventional “wisdom” that stocks are safe in the long run – may lead to too much risk taking. Money illusion may distort perceptions in the pension domain and make people sensitive to the framing of guarantees. In the remainder of this section we discuss these biases.

a) *Intertemporal choice with immediate gratification*

Saving for retirement implies sacrificing current consumption. The notion that people find it difficult to stick to their plans is not new in economics. Paul Samuelson derived the optimal strategy for an individual who seeks to maximize lifetime utility. However, he made it clear that he regarded the assumption of time-consistent preferences as completely arbitrary:

“it is extremely doubtful whether we can learn much from considering such an economic man, whose tastes remain unchanged...who seeks to maximize consumption only....in a perfect world where all things are certain...” (Samuelson 1937, p. 160)

In *The Theory of Moral Sentiments* Adam Smith, when discussing intertemporal choices involving short-term gratification, described the will power problem as a conflict between the “passions” that lead to short-sighted behavior, and the farsighted “impartial spectator” (see Ashraf, Camerer and Loewenstein, 2005).

Yet, it is only recently that economists have systematically incorporated lack of will power and self control problems in their models of microeconomic behavior. The first to do so were Thaler and Shefrin (1981), who described decision making as a conflict between a planner, who aims at maximizing lifetime utility, and a doer, who behaves as a one-day fly. The self-control model and the hyperbolic discounting approach explain the empirical evidence that people delay saving for the distant future for much longer than their long-term preferences would suggest (Frederick, Loewenstein and O'Donoghue, 2002).

Bounded will power in the field of personal finance implies that even if people are well informed and have the intention to save more for retirement, they delay doing so. Obviously, this has implications for any policy aiming to help people make good choices (see Section 4 below). In fact, information and education seem at best to influence intentions

only. Choi, Laibson, Madrian and Metrick (2002) find that after a financial education seminar 100% of participants announce that they will enroll in the companies' pension plan; in the end, a mere 14% has actually enrolled.

Behavioral economics distinguishes between sophisticates - people who are aware of their will power problem and look for self-commitment strategies – and naïves – people who believe they will have no difficulties changing their behavior, “tomorrow.” An example of a commitment strategy in the pension domain is the SMaRT mechanism, whereby employees can sign a contract now in which they agree to start saving more for retirement two years from now (Thaler and Benartzi, 2004). The program resulted in a large increase in retirement savings, and Vanguard has adopted it (Stewart, 2005).

b) Complex choice

Economists have traditionally assumed that more choice is better. This view is now challenged, as it is clear that when there is “too much” choice, people are discouraged from choosing anything, or, if they are forced to choose, simply pick something (Schwartz, 2005). Complexity delays choice, increasing the fraction of consumers who adopt default options – see below (O'Donoghue and Rabin, 1999), and it biases choice, since people tend to avoid complex options (Iyengar and Kamenica, 2010).

Research into pension portfolio allocation documents the “paralyzing” effect of increased choice. Huberman and Jiang (2006) study the records of more than half a million participants in more than six hundred pension plans that differ in the number of funds they offer (ranging from 4 to 59). They find that the median number of funds used is between three and four, and does not depend on the number of funds offered by the plans. Moreover, participants tend to allocate their contributions evenly ($1/n$) across the funds (the “ $1/n$ heuristic”).

Not only does more choice hardly provide any advantages: it even reduces participation. Huberman, Iyengar and Jiang (2004) study participation decisions in retirement saving plans. They find that participation in plans offering ten or more funds is lower than that in plans that offer only a handful of funds. From a rational perspective this is counterintuitive, as a higher number of funds would increase the probability that the plan offers allocation possibilities in line with employee preferences. From a behavioral perspective, it confirms the relationship between complexity on the one hand and choice avoidance on the other.

That people tend to avoid choices when they are complex has to do with anticipated regret and the omission bias: the more options to choose from, the more people anticipate regret if they make the wrong choice (Schwartz, 2005). Providing more information and

education does not solve this psychological problem. Or, as Redelmeier and Shafir (1995) put it: “Thinking harder will not eliminate a cognitive bias any more than staring harder will make a visual illusion disappear”. Moreover, as Herbert Simon (1955) has pointed out, people may be distracted instead of helped by information.

c) Passive choice

People often choose not to choose. As a result, defaults (what you choose if you do not take action, silent consent) affect behavior. There are several explanations for the default effect. People may regard a default as the recommended choice by experts. They may interpret the default as the social norm (in the descriptive sense: what most people do, or in the injunctive sense: what most people approve of). Deviating from the default requires an effort, either in terms of time, money, or psychologically. People may forget the deadline for taking action, or lose the form they need to fill in. People have an omission/commission bias: an active choice (act of commission) results in more regret if things turn out wrong, than a passive choice (act of omission (Potters and Prast, 2009)). As we have seen above, people tend to delay choice if it is complex, which in case of passive choice implies choosing the default (O’Donoghue and Rabin, 2004).

The default effect exists for a wide range of domains, but it is especially prominent in life-cycle saving and investing decisions. It plays an important role in decisions regarding pension plan participation, the retirement savings rate, asset allocation and in the withdrawal of pension wealth when changing jobs or upon retirement. If the default is to not enroll – that is, the scheme is opt-in - employees are slow in becoming a plan member. If enrollment is the default, over 90 percent of new employees immediately participate in the company pension plan. The difference in participation is still high at two years of tenure: 25 percentage points higher under automatic enrollment as compared to a default of non enrollment (Beshears et al, 2005).

Automatic enrollment requires a default savings rate set by the employer. Madrian and Shea (2001), Choi et al (2003), and Beshears et al (2005) find that the default rate attracts a high fraction of employees. Note, that because of this default rate effect, defaults can also reduce savings. If the default rate is set below the level that active participants would have chosen, the effect on total savings of an increase in the fraction of employees participating can be (more than) offset by the effect of a lower average savings rate per participant (Beshears et al., 2005).

Defaults also affect behavior in the decumulation of retirement savings. In Switzerland, employees in DB schemes have no discretion in the accumulation phase. Upon retirement, however, they can choose between an annuity and a lump sum. Bütler and

Rational Pensions for Irrational People

Teppa (2005) find that the company default has a major effect on the choice between the two.

d) Limited experience/little opportunity to learn from mistakes

People learn from their mistakes. By getting feedback, they invest in their choice capacity. However, there are domains and types of choice where the opportunities to learn are virtually absent. Saving for retirement is one of them. The 70-year old who finds out that he has saved too little for retirement has no opportunity to benefit from this knowledge. Moreover, people hardly learn from others' mistakes. Choi et al (2005) show that the experience with Enron, Worldcom, and Global Crossing – employees who lost both their job and their pension savings did not affect the pension asset allocation of workers outside these firms. This may be due to cognitive dissonance – people will not face inconvenient truths – and to overconfidence – it won't happen to me – (Akerlof and Dickens, 1982). A final reason why people do not learn from their mistakes is that private parties tend to exploit psychological biases (see below).

e) Third-party marketing

Behavioral economics argues that profit-maximizing firms can and do exploit the predictable inconsistencies and biases of their customers. Through contract design, pricing schedules, and marketing techniques they exploit their customers' self control problem, their status quo bias, and their sensitivity to defaults and choice complexity (Samuelson and Zeckhauser, 1988; DellaVigna and Malmendier, 2004; Gabaix and Laibson 2006; Agarwal et al, 2010).

Automatic renewal of contracts and non-monetary transaction costs of switching exploit the status quo bias and default sensitivity of the customer.

Partitioned prices reduce consumers' perceptions of their total purchase costs (total cost of ownership, in business terms) and increase demand (Morwitz, Greenleaf, Shalev and Johnson, 2009). Moreover, even if the cost of add-ons were visible, naïve customers are attracted by the low base-price because of their present bias.

"You can fool all of the people some of the time, and some of the people all of the time. But you can't fool all of the people all of the time." Well, perhaps you don't need to. If all customers were rational, firms would choose to unshroud their prices in equilibrium. However, as Gabaix and Laibson (2006) put it:

Educating a myopic consumer turns him into a (less profitable) sophisticated consumer who prefers to go to firms with loss-leader base-good pricing and

Rational Pensions for Irrational People

high-priced (but avoidable) add-ons. Hence, education does not help the educating firm.

Third-party marketing strategies abound in the financial services industry. (Ausubel, 1999) Agarwal et al (2010) study lifecycle patterns in credit behavior follow a U-shaped pattern, with the cost-minimizing performance occurring around age 53. A likely explanation is that financial companies benefit from the fact that young borrowers are relatively inexperienced, and elderly borrowers have limited fluid cognitive abilities. Financial institutions compete for the “sophisticates,” who are cross-subsidized by the “weaker” customers.

In addition to the five circumstances mentioned above taken from Beshears et al (2010) there are several other bias issues that complicate retirement planning.

Myopic loss aversion may lead to portfolio choices that are inconsistent with long term risk preference, notably in the retirement planning domain (2004).

Money illusion – defined as a tendency to think in terms of nominal rather than real monetary values – influences the way people react to variations in inflation and prices (Shafir, Diamond and Tversky (1997)). The term nominal guarantees used in the Netherlands exploits money illusion, as it suggests that a guaranteed nominal pension income meaningful economic value. The power of money illusion in the pension domain is obvious from the different reactions to the indexation implications of the low coverage ratio of pension funds on the one hand, and the protests against the announcement of nominal cuts to deal with the underfunding on the other (Prast and Snippe, 2010).

The Time Diversification Fallacy. Time diversification is the idea that the riskiness of stocks diminishes with the length of an investor’s time horizon and therefore the young should invest more heavily in stocks than the old. It is regarded as “gospel” among financial advisors and results in a bias towards investing in equities even for investors who ought to avoid them.

Finance theory indicates that no such simple rule applies in all cases. If investors act so as to maximize the expected utility of consumption over their lifetimes, then an investor's age per se has no predictable effect on the optimal proportion to invest in stocks. Robert C. Merton and Paul A. Samuelson have written many articles over the years explaining the fallacy (Merton and Samuelson, 1974; Samuelson 1963, 1989, 1994, 1997). Bodie (1995) uses option pricing theory to show that the riskiness of stocks – measured by the cost of insuring against the risk of earning less than the risk-free rate of interest - increases rather than decreases with the length of that horizon. Bodie’s proof

is valid both under the assumption of a random walk process for stock returns and for the mean-reverting processes reported in the economics and finance literature.

Rational asset allocation for individuals should be viewed in the broader context of deciding on an allocation of *total* wealth – human and financial – between risk-free and risky assets. A critical determinant of optimal asset allocation for individuals is the time and risk profile of their human capital. A person faces an expected stream of labor income over the working years, and human capital is the present value of that stream. One's human capital is a large proportion of total wealth (human capital plus other assets) when one is young and gradually decreases as one ages. From this perspective, the optimal strategy may be to start out in the early years with a high proportion of one's investment portfolio in stocks and decrease it over time as suggested by the conventional wisdom. The conventional wisdom, however, may not apply to broad classes of individuals who face substantial human-capital risk early in their careers. For such individuals, the *opposite* policy may be optimal—that is, to start out with a relatively low fraction of the investment portfolio in stocks and increase it over time. Another critical determinant of the optimal investment in stocks is how close people are to some minimum *subsistence* level of consumption. People should be expected to insure against falling below such a level through their asset allocation policy

4. Behavioral economics lessons for the pension system in the Netherlands

Behavioral economics has demonstrated that people often and predictably fail to make good decisions. In the previous section we have discussed under which circumstances people do not do what they would like to do/what they should do, given their preferences. We have also made it clear that those circumstances apply to life cycle saving and investment behavior, and hence are of high relevance to the domain of pension savings. In this section we will discuss what these behavioral lessons imply for the pension system in the Netherlands. We address the following questions:

- 1) Does it make sense to have a very large semi-compulsory layer without much freedom of choice for employees?
- 2) Does it make sense to have a high level of mandatory annuitization?
- 3) Do Dutch employees save too much as a result of high semi-compulsory saving in the second layer?
- 4) How can we design better pension arrangements for the self employed?
- 5) Should the third layer supply more standardized products?
- 6) What is the role of government regulation in this respect? Can financial education assist people in making better decisions in their life-cycle financial

planning?

- 7) What should be the role of the “pension register” that will provide information on individual pension rights by 2011?
- 8) Should the second layer make more use of defaults and what does this imply for the relationship with the third, voluntary layer?
- 9) When should we make pensions compulsory and when should we use defaults?
- 10) How should defaults be designed to take account of differences in individual circumstances and preferences?

In the past, both the government and the pension industry in the Netherlands have made it clear that they feel responsible for informing and educating citizens about financial decisions in general and pension issues in particular. Examples are the establishment of the Centiq platform on financial education and the since 2008 mandatory Uniform Pension Overview. The soon-to-be-launched Pension Register is meant to give people easy access to information about their pension rights.

The assumption underlying a policy aimed at helping individuals make good choices by informing them is that well informed individuals make choices that are consistent with their preferences. However, as we have seen in the previous section, revealed and normative preferences differ consistently in the domain of life cycle saving and investing. In fact, the behavioral evidence indicates that information may affect intention, but is hardly enough to influence behavior. Some studies even suggest that education may be counterproductive. Instead of turning financial consumers into market players who are both motivated and competent to make financial decisions that maximize their own welfare, it may increase confidence without improving ability, leading to worse decisions (Willis, 2006). At any rate, education and information provision *by themselves* cannot address most behavioral problems.

Some argue that in a compulsory system it is important that trustees disclose to the participants why they select certain investment strategies, disclosure of information being essential to gain trust. In this view, efforts to provide more pension information in the second layer are not so much driven by the desire to have people make better choices but rather by the desire to retain the trust and confidence of participants so that the second layer keeps its legitimacy. However, most of the information provided focuses on individual pension rights, not investment strategies. Moreover, if the intention is to gain support, in our view the pension sector would have done better by avoiding terms like “nominal guarantees” which, as

we have pointed out, set people on the wrong foot. Just as consumers are not expected to be their own doctors, they should not be their own financial experts, especially given the enormous gap between actual consumer skills on the one hand, and what would be needed to benefit optimally from today's (and tomorrow's) financial technology on the other. Neither can we expect to, or should we aim at, making people rational (Merton and Bodie, 2005),

The evidence presented in the previous section has made it clear that the *institutional design* of pension schemes matters very much for the pension choices people make, while information and education have a much smaller role – if any – to play when it comes to assist people in making better decisions in their life-cycle financial planning. In our view any institutional design of pension saving should take these behavioral lessons into account.

Some might argue that Dutch employees have been “pampered” by a generous system of social security, and that if left to themselves, they will learn to become competent financial market participants. Van Rooij, Kool and Prast (2007) find that risk aversion is especially high in the pension domain, and that the typical employee considers himself to be financially illiterate. Lack of exposure to self-directed savings plans and investments may go some way in explaining both the low level of self-assessed financial expertise and the high level of self-assessed risk aversion. However, US evidence indicates that financial illiteracy has not disappeared with the widespread introduction of individual DC plans (Lusardi and Mitchell, 2005). Few participants in the US have really been successful in realizing their pension targets and many of them fall victim to agency problems, including the third-party marketing techniques described in section 3 of this paper. The U.S. approach – government regulation of consumer credit, insurance, and investment products based on disclosure and unfettered choice, accompanied by financial literacy campaigns – has not been successful. Moreover, it is important to keep in mind that where decisions are taken infrequently or even once in a lifetime, there is little scope to learn from mistakes. In fact, the behavioral evidence underscores that a carefully designed choice architecture does much more to help people.

An important question is whether behavioral biases, such as the present bias and lack of will power, is distributed uniformly over income groups or, alternatively, are more heavily concentrated among low-income groups. In the latter case, the optimal institutional design might differ across income groups. First of all, behavioral biases do not seem to disappear with higher education and/or higher income. Illustrative in this respect is the

Rational Pensions for Irrational People

outcome of an experimental study by Choi, Laibson and Madrian (2006) among Harvard staff (white collar non-faculty employees) with many years of experience managing their personal finances, 88% with a college degree and 60% with graduate school education as well. Each subject was given \$10,000 to allocate across four S&P 500 index funds and could keep the subsequent return net of fees. Harvard staff members failed to minimize fees, even after they had been given some specific financial education.¹ Performance was only slightly improved by education. As for automatic enrollment, US evidence indicates that the effect differs between income groups in the US: the increase in participation is higher for the lower income groups. Aggarwal *et al* (2010) find that, after accounting for default probability, income and education, economic mistakes show strong age-based patterns, even among prime borrowers, with the middle-aged doing better than the old or young. Their explanation is that firms compete for the sophisticated middle aged consumer, who is then subsidized by the young who are inexperienced, and the old whose analytical abilities are lower.

As for the Netherlands, the Dutch Nibud institute for budgetary education, in co-operation with Wageningen University, has studied whether people regard their financial buffers as adequate. Although there are differences across income groups, with more lower incomes having buffers that they regard “too low”, the study concludes that ten percent of the *highest* income quartile in the Netherlands does not have the financial buffer that they think they should have (Nibud, 2005). Lessons regarding the relationship between income and portfolio choice can also be learned from the Swedish experience, which concludes that high income employees who opted out of the safe default did choose highly biased portfolios with high management fees (Cronquist and Thaler, 2004)

Hence from a *behavioral* point of view there is no reason to differentiate the institutional design according to income groups. Obviously, financial mistakes hurt low-income groups more than high-income groups, and that might be a consideration to keep in mind when thinking of the optimal pension arrangement. That falls out of the scope of the present paper, however.

What then are possible arrangements for the Netherlands that take account of behavioral issues, make optimal use of available technology and are in line with financial consumer ‘s individual circumstances and preferences?

¹ i.e. a one page of answers to the following questions: (1) What is a mutual fund? (2) What is an S&P 500 index fund? (3) What is the S&P 500 Index? In the basic treatment fees paid were on average

Rational Pensions for Irrational People

In answering this question, we distinguish between employees and self-employed. The proposed arrangements for these groups are somewhat, but not extremely, different. This should come as no surprise, as both groups suffer from the same behavioral biases, and the complexity of financial planning is also similar.

Employees

As we have seen in Section 2, for employees the current second layer in the Netherlands is semi-compulsory. If an employer offers an occupational pension plan, employees have no choice but to participate, and as almost all firms offer a plan, over 90% of employees are “forced” to be an occupational plan member.² Only 9 out of 30 OECD countries have mandatory private pension schemes, and it is a fact that these countries show a high participation compared to countries with voluntary private pension schemes (Van Els *et al*, 2007).

From a rational economics perspective, one would conclude that the participation in countries with voluntary schemes corresponds to true preferences. However, one of the behavioral economics lessons is that the majority of people needs and welcomes mechanisms that help them overcome their lack of will power and tendency to procrastinate. In fact, in the Netherlands a mere 20% of the self-employed (that is, those who are not forced to save) believe that they save enough for retirement, against 75% of employees (Van Rooij, Kool and Prast, 2007).

Does this imply that participation by employees should in the future continue to be mandatory? The evidence suggests that there may not be much difference in outcomes between making participation mandatory or making it the default option. Of the possible commitment mechanisms, a mandatory arrangement is the most “distortionary” compared to alternatives that take account of self control issues and procrastination, like automatic enrollment and/or a SMaRT contract, or an even softer alternative, mandatory active choice: requiring employees to actively decide whether or not they wish to become a plan member. Choi, Laibson, Madrian and Metrick (2005) show, that a mandatory active decision increases participation in pension schemes as compared to automatic non-enrollment (opt-in) by around 25%. Madrian and Shea (2001), Choi et al (2003), and Beshears et al (2005) find that the default rate attracts a high fraction of employees.³ This

² The only way that employees can choose between plans is by choosing the firm that they work for.

³ Note, that because of this default rate effect, defaults can also reduce savings. If the default rate is set below the level that participants would have chosen, the effect on total savings of an increase in the fraction of employees participating can be (more than) offset by the effect of a

implies that the design of defaults is crucially important.

Before the financial crisis, the majority of Dutch employees declared themselves in favor of the current mandatory system, the two main reasons being that they do not want to think about retirement saving, and that they are afraid that if plan participation were not compulsory, they would not save enough – the latter being evidence of awareness of a willpower problem (Van Rooij, Kool and Prast, 2007).⁴ Although the financial crisis and the pension problems that it has revealed no doubt have reduced trust in the current system and institutions, the typical employee still has a willpower problem, and does not want to think about his pension. Moreover, the typical Dutch employee feels he would not be able to manage a pension portfolio. He considers himself financially unsophisticated and is reluctant to take control of managing his retirement fund, even when offered the possibility to increase expertise (Van Rooij, Kool and Prast, 2007). Given that employees are happy with the current system being semi-mandatory, this could be the preferred solution over automatic enrollment and softer arrangements. As far as information and education are concerned, the evidence shows that they affect intention, not behavior.

As for the high mandatory annuitization, this seems to have the obvious advantage of preventing people to take out too much money at retirement age due to the present bias. In our view introducing through reverse mortgages for retirees would be more attractive..

Given the behavioral evidence, what we know about employee preferences in the Netherlands, and the risk shift to employees which exposes them to asset market risk, the optimal arrangement should help people deal with their present bias while at the same time give them some choice. This could be either by mandatory participation combined with some choice as to the level of risk, by automatic enrollment with a carefully designed default, or by a mandatory active decision with limited choice.

Assuming a “behaviorally sound” institutional design, we recommend use of financial technology to design mass customized personal pension contracts at the lowest possible cost. Current debates on financial products tend to focus on complexity of products as something to be avoided, at least for people who are no experts. In our view, having people make complex choices is indeed to be avoided both because of the behavioral

lower average savings rate per participant (Beshears et al., 2005)

⁴ It should be kept in mind, however, that the survey took place before the financial crisis, hence before it became clear to participants that in the current mandatory system they do bear some asset market risk.

Rational Pensions for Irrational People

issues outlined in the previous section, and because making optimal choices in the domain of retirement planning is too difficult. But this does not necessarily imply that individuals saving for retirement cannot benefit from financial technology – on the contrary (Prast, 2007). Given that the current mandatory participation meets with large support by employees, we would suggest to keep the current arrangement. However, in our view the employee should be offered meaningful choice regarding the minimum target income that he would like to see guaranteed, an income ambition combined with the risk that the ambition is not met, and his retirement age (Bodie, Prast and Snippe, 2008). This way employees would have downside protection while benefiting from upside potential. Moreover, high income employees (or those with a lot of financial wealth) would be free to choose a low minimum target combined with a high risk level (as well as a low retirement age) if they feel they can take care of pension saving and investing by themselves. This way they are not constrained by the mandatory participation. The risk of not realizing the (individually selected) minimum income level would be minimized by allocating the available assets and expected future contributions to the portfolio of fixed income investments that minimizes the mismatch between the expected asset returns and future contributions on the one hand and the cash flow requirements resulting from the selected minimum post-retirement income (or purchasing power) target on the other. As before, if the available assets and expected contributions are not fully needed for the allocation to fixed income investments that matches the minimum income target with the aim of reaching a desired income target that exceeds the minimum income target. The second question that participants have to answer is about the desired income level that they wish to achieve as well as the risk tolerance with respect to this income. The optimal composition of the portfolio of more risky assets maximizes the probability of realizing that desired income level. This probability may be increased by selling the upside above the desired income level. In this case, participants would 1) select their minimum required level (or replacement ratio). This results in a requirement on available assets and contributions, depending on the (real) interest rate. The distinction between a minimum income level that should be relatively safe and a desired income that may or may not be attained depending on asset performance is not inline with CRRA preferences, but it is consistent with a preference for protecting the downside (eg buying insurance) while at the same time keeping open the possibility of benefiting from the upside (buying a lottery ticket). Employees would not have to decide upon a frequency distribution, as they should be offered e mare two alternatives to the safe default (eg: the risk

of not reaching the desired level is X percent).

Note that in this solution, the plan sponsor would not be the residual risk bearer, as it would be in a classic DB plan. Note also that the system combines individual contracts with mandatory participation as well as collective management and administration.

Smetters and Lin (2010) show how financial technology can be used to limit losses while benefiting from upside potential even when account is taken of behavioral finance findings and of fat tails/shocks that are not normally distributed. A strategy which caps maximum losses implies a portfolio that underperforms during small bulls, but outperforms a stock-bond blend with similar downside risk. As the purpose of investing for retirement is not to get rich, but to reach a standard of living at retirement, this is an appropriate strategy which is in line with the science of finance. Bodie, Ruffino and Treussard (2008) describe a mass customization process for the design and production of pension contracts based on Contingent Claims Analysis. Within such a mandatory arrangement with meaningful individual choice, there would not be much need for a third layer, as employees can already choose their optimal solution within the mandatory plan.

Self employed

Self employed are, by choice, not part of a collective labor agreement. Hence it is difficult if not impossible both from a practical and principle point of view to make participation mandatory. However, their (self assessed) savings rate is too low and they cannot be expected to make optimal saving and portfolio decisions. Their welfare could be improved either by enrolling automatically in a default plan, or by making active choice mandatory. This could be done when they apply to the Chamber of Commerce (Kamer van Koophandel) to set up their business in order to get a VAT number. For those who have initially chosen not to participate, the mandatory active choice could be repeated each time they fill in their tax statement.

We would be in favor of a single “public” plan, with administration and investment auctioned off to the private sector. As we have seen, more choice hardly provides any advantages: it even has been shown to reduce participation, due to the relationship between complexity and choice avoidance. We therefore recommend to offer those self employed who have indicated that they want to become a plan member (or, alternatively, who have not opted out) a plan with limited choice, in line with the meaningful choice which in our view should be offered within the occupational layer that we envisage (see above).

Our solution differs from the proposal by the Goudswaard committee, which suggests that for the second layer the Dutch choose between either a lower, but guaranteed pension income for all, or a higher, but risky pension for all. A low guaranteed income will not be sufficient for many (if not all) employees. In order to prepare optimally for retirement, these employees would have to search individually for an additional pension (third layer). The behavioral evidence indicates that not much good is expected to come out of this. As for the alternative, a higher but riskier pension, it is in our view suboptimal to expose employees to asset market risk without giving them a say in how much risk they find acceptable. Moreover, given the low risk tolerance in the pension domain (Prast, Van Rooij and Kool, 2003) many employees would have to go out search for insurance, which we know they wouldn't. The lower incomes would be the most vulnerable in this system.

A behaviorally sound design would be to enroll participants in a sensory default with a lot of protection, and give them two riskier alternatives. The effect of myopic loss aversion – a level of risk that is too low given preferences – can be prevented if participants are not given the possibility to evaluate their portfolio. Most people never look at their DC plans again anyway, after setting them up (Merton, 2010). Our institutional arrangement would enable participants to benefit from scale advantages. Additional efficiency gains may also be realized through the collective purchase and/or insurance of annuities. The guarantees should be in real terms or in replacement rates rather than nominal amounts; this requires more supply of index linked bonds than is currently available

It is sometimes argued, that individually tailored contracts would be prohibitively expensive: employees would not be willing to pay the premiums needed. Bovenberg et al (2007) argue that the cost of collective plans is usually lower than the costs associated with individual pension plans. They point to the time-consuming search by customers and the marketing costs incurred by financial intermediaries, indicating that the additional costs amount to almost 1% of financial wealth.

We would like to point out that collectiveness does not automatically imply solidarity. The present system in the Netherlands is a case in point: by pooling resources, the system makes sure that higher incomes (with on average higher life expectancy) are subsidized by lower incomes (who in average live shorter).

We agree that customized contracts provided at the individual level by intermediaries are costly. However, the institutional arrangement for the personal pensions that we envision

does not have to entail higher costs and lower efficiency. Semi-customized fully hedged contracts designed and guaranteed by low transaction cost financial intermediaries can be offered at a low price to high-transaction cost financial consumers (Bodie, Prast and Snippe, 2008)). If these contracts are offered to groups of employees as defaults, they can be designed to take account of needs and circumstances shared by all members of the group. In doing so, the default sensitivity in the retirement planning domain can be put to good use in the interest of the financial consumer (Beshears et al, 2005, 2010; Kooreman and Prast, 2010). Similarly, the plan for self employed could offer a basic minimum target pension as default, and an additional ambition level combined with the risk tolerance not to reach it. At first sight the group of self-employed is perhaps more heterogeneous than that of employees in a given firm or industry (De Jong, 2009). However, the self employed have many characteristics in common: they tend to be mostly of a below-average age, are more often women, and have partners that earn a labor income. Some of them may have deliberately chosen to become self employed, others may have been forced to do so because they did not find a job. They typically tend to prefer flexibility in contribution levels and may prefer liquid saving over illiquid pension saving given that they have no contract rights, a volatile income and no social insurance. However, they state that their pension savings are too low and need to save for retirement anyway. Moreover, by having them enroll automatically and then choose their minimum target income, they have flexibility while at the same time the threshold for starting to save for retirement is low.

The powerful effect of choice architecture requires that this architecture is designed carefully. As Nijman and Bovenberg (2009) correctly point out, to make further progress here, more research needs to be done, for example by using micro-econometric data to document heterogeneity across individuals.

For the collectively managed individual personal pension plans that we envisage, defaults could be designed for relatively homogeneous groups depending on relevant objective and easily observable characteristics that are relevant for optimal saving and investing. Goda and Flaherty Manchester (2010), study the effect of an age based default rule for the choice between remaining in a DB plan or switching (irrevocably) to a DC plan within the same firm, using data from a large employer that transitioned from a defined benefit (DB) plan to a defined contribution (DC) plan and offered existing employees a choice of plans. Employees who did not make an active choice were defaulted according to the following rule: switch to the DC plan if under age 45, remain in the DB plan if age 45 or older. The default had a considerable effect: it increased the probability of enrolling in one plan over the other by 60 percentage points. Moreover, for a broad range of levels of risk aversion, conditioning the

Rational Pensions for Irrational People

default for the choice between pension plans on age can substantially improve welfare as compared to a uniform default. Other welfare gains are possible by varying defaults according to observable characteristics. In case the Netherlands would like to switch from the current system to an infrastructure where risks are more explicitly shifted toward pension rights, one way of doing so would be to offer an age based default rule for enrollment in the new system.

In addition to easily observable and objective characteristics, additional relevant characteristics may be used to further improve the “match” between default and plan participants. Goldstein et al (2008) and Dinner and Goldstein (2010) distinguish between the following types of defaults:

Simple defaults - a default configuration set by the policy maker

Forced choice: Ask user one or more questions to determine the default

Random defaults: Choose a default randomly from several alternatives

Sensory defaults: (If-then rules). Choose among multiple defaults based on any available data

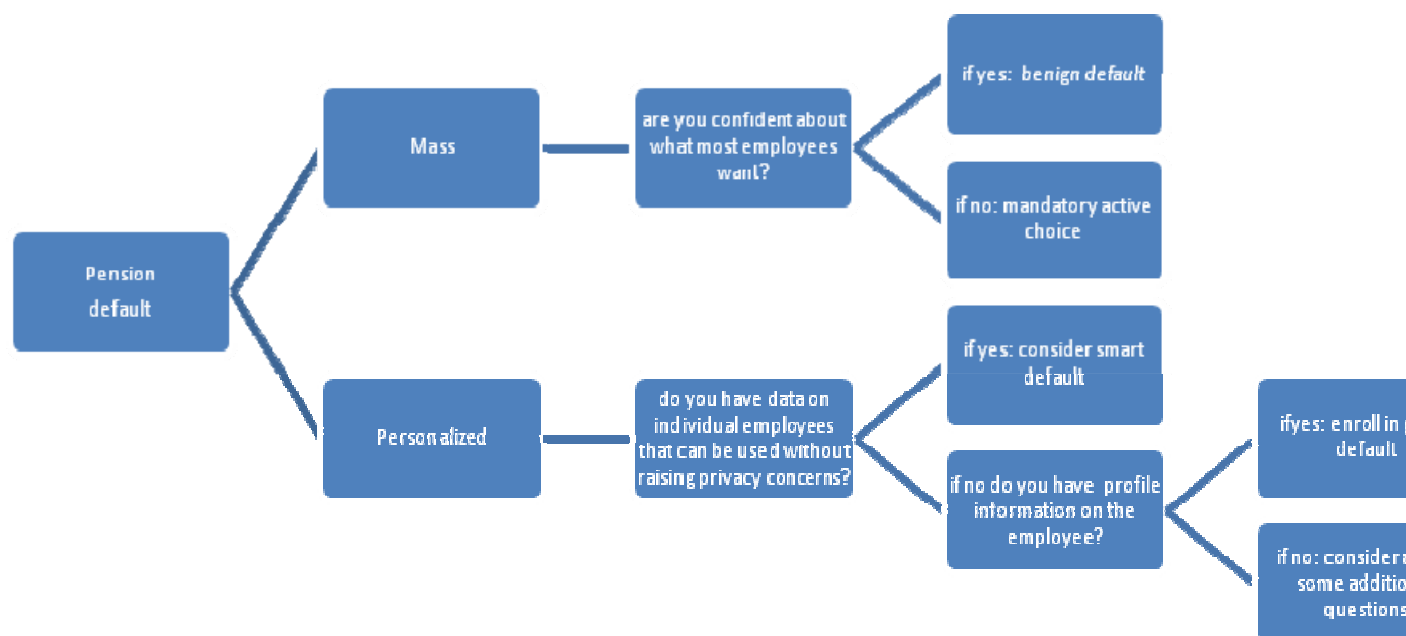
Clearly, simple defaults can be applied if the population that the default is meant for is very homogeneous. Random defaults are unlikely to optimize welfare for any type of population, although it may be an improvement relative to a non-participation default. Forced choice requires an effort from the employee, but should be an improvement relative to non-participation. Employers already have some information available about their employees – age, income, type of job (hence riskiness of human capital and exposure to stock market risk) and usually some additional information as well either directly or through collective arrangements (health insurance, which would reveal whether employee has a spouse and/or children). Therefore, sensory defaults should not be too difficult to offer, and once employees are defaulted into a plan based on these data, further refinement and personalization could be applied by asking additional questions (does your spouse work? do you have financial capital exceeding amount X? do you own a home....).

Goldstein et al (2008) suggest a decision tree for firms who would like to optimally and efficiently service their customers. Figure 1 is inspired by their idea, and adapted to pension defaults. It can be used for participation, premium, portfolio and decumulation defaults.

For participation, it is most likely that the decision tree will lead to a benign default of standard enrollment. For the savings rate and portfolio choice, either (with mass default) mandatory choice or (with personalized default) one of the other options. For decumulation, depending on general preferences either an annuity default or mandatory choice (mass

Rational Pensions for Irrational People

default) or a more personalized default. Depending on the available information to the employer or pension fund personalized choices may be feasible.



In the Netherlands, the pension register would be helpful in bringing together individual pension wealth accumulated in various occupations. Efficiency might be further improved by obtaining data on income and wealth through tax data (after consent from individual employees). This suggestion often meets with criticism because of privacy issues: the employer or other institution taking care of the pension administration would be informed about for instance the wealth status of the plan participant. We are not convinced by this argument and would like to point out that employers usually have information on their employees that in our view is no less private: whether the employee is married, has children, is pregnant. Moreover, hiring is often preceded by assessments of the personality of the candidate, and sometimes these assessments even include information based on an integrity assessment including e.g. police records. Also, in the financial sector compliance rules demand detailed information on financial decisions so as to prevent insider trading. Be that as it may, the privacy issue may also be tackled by asking the employee for explicit consent. The pension register that is being set up in the Netherlands could also be used to this end.

Rational Pensions for Irrational People

Given the behavioral evidence on education, intention, and actual behavior, we do not expect much from the register if it is not accompanied by default-type mechanisms to facilitate additional pension saving by those who do not save adequately.

Summing up, we envisage a pension plan which has the simplicity the participant needs given both his behavioral biases and the fact that making optimal life cycle saving and investment decisions is highly complicated, but within a DC-type institutional structure (Merton, 2006b).

6. Conclusion

Core findings in psychology and economics are that people deviate from the rational choice model in *all of the following respects*: they have nonstandard time, risk and social preferences; they are systematically biased in the gathering and processing of information; and they exhibit systematic and predictable biases in decision making. In addition to behavioral biases that would complicate decision making even among simple products, the area of life cycle saving and investing is too complex to provide financial consumers with information, and then leave it to them to make good decisions. At the same time, financial technology could (and, in our view, should) be used to design optimal (semi-) individual contracts at low cost.

From the point of view of the employee, the current second layer plans in the Netherlands have the flaw that they are not tailored to individual needs and preferences, are less attractive for younger employees, are not robust to an aging labor force, and expose employees to asset market risk even up to the point where nominal claims are not guaranteed. In this paper we have suggested a possible improvement for both employees and self employed. As for employees, we suggest a mandatory occupational system to deal with self control problems and procrastination. However, within this mandatory (at the firm or industry level) system we propose limited, meaningful choice for the employee. He should be able to choose his retirement age, minimum target income, ambition income combined with his tolerance for not realizing this ambition. Within this framework there could be a carefully designed sensory default (both for minimum and ambition income levels, retirement age and risk tolerance) or a mandatory active choice between various options in terms of minimum income level and income ambition in combination with the risk that the ambition is not realized. As for the self employed, we suggest either a participation default (opt-out) or an active choice when the self employed registers at the Chamber of Commerce and/or with his tax statement.

This way, the institutional design of the system would take account of behavioral evidence regarding systematic and predictable decision errors and of the preferences of employees for a mandatory system: “good” decisions are made easy. At the same time, it allows for some choice in terms of minimum target income level as well as an ambition level combined with the risk that this ambition will not be realized.

References

Agarwal, Sumit, John C. Driscoll, Xavier Gabaix and David Laibson (2010), “The Age of Reason: Financial Decisions over the Life Cycle and Implications for Regulation” *Brookings Papers on Economic Activity*

Akerlof, G. and W.T. Dickens (1982), The economic consequences of cognitive dissonance, *American Economic Review* 72 (3), pp. 307-314

Ashraf, N., C. Camerer and G. Loewenstein (2005), Adam Smith, behavioral economist. *The Journal of Economic Perspectives*, 19(3), 131-145

Ausubel, L.M. (1999), Adverse Selection in the Credit Card Market, *mimeo*, University of Maryland, College Park, 1999

Beshears, John, James J. Choi, David Laibson, Brigitte C. Madrian (2005), The Importance of Default Options for Retirement Savings Outcomes: Evidence from the United States, *NBER Working Papers*

Beshears, John, James J. Choi, David Laibson, Brigitte C. Madrian (2008), How Are Preferences Revealed?, *Journal of Public Economics* vol. 92(8-9)

Bodie, Zvi (1995) “On the Risk of Stocks in the Long Run,” *Financial Analysts Journal*, May-June, 18-22.

Bodie, Zvi, Henriette Prast and Jan Snippe (2008), Individuele pensioenoplossingen: doel, vormgeving en een illustratie, *NEA paper* 10

Bodie, Zvi, Dorian Ruffino, and Jonathan Treussard, (2008) Contingent Claims Analysis and Life-Cycle Finance,|| *American Economic Review: Papers & Proceedings*, 98:2, 291–296.

Lans Bovenberg, Theo Nijman, Coen Teulings and Ralph Koijen (2007), Saving and investment over the life cycle: the role of individual and collective pension funds *Netspar Panel Paper* 1 - juli 2007

Bovenberg, A.L., and T.E. Nijman (2009) Developments in pension reform: The case of Dutch stand-alone collective pension schemes. *International Tax and Public Finance*, 16(4), 443-467

Camerer, Colin (2006), Behavioral Economics, in Blundell, R , W. Newey and T Persson (eds), *Advances in Economics and Econometrics: Theory and Applications*, Ninth World Congress of the Econometric Society, Vol. 2. v

Choi, J.J., D. Laibson, and B. Madrian (2003), Passive Decisions and Potent Defaults, *Working Paper* Harvard University.

Rational Pensions for Irrational People

Choi, James, David Laibson, and Brigitte C. Madrian (2005) "Are Empowerment and Education Enough? Under-Diversification in 401(k) Plans" *Brookings Papers on Economic Activity* Volume 2, pp. 151-198.

Choi, J.J., D. Laibson, and B. Madrian (2006), Why Does the Law of One Price Fail? An Experiment on Index Mutual Funds, NBER Working Paper #12261.

Choi, James, David Laibson, Brigitte Madrian, and Andrew Metrick (2002), Defined Contribution Pensions: Plan Rules, Participant Decisions, and the Path of Least Resistance. In James Poterba, (editor). *Tax Policy and the Economy* (16) 67-114.

Choi, J.J., D. Laibson, B. Madrian, and A. Metrick (2005), "Optimal Defaults and Active Decisions", NBER Working Paper # 11074.

Coase, Ronald (1936), The Nature of the Firm, *Economica*, New Series, Vol. 4, No. 16. (Nov., 1937), pp. 386-405

Committee on the Sustainability of Supplementary Pension Schemes (Goudswaard Committee) (2010), *A strong second pillar - Toward a sustainable system of supplementary pensions*, The Hague

Cronquist, Henrik, and Richard Thaler (2004), Design Choices in Privatized Social-Security Systems: Learning from the Swedish Experience, *American Economic Association Papers and Proceedings*, May 2004

De Jong, Frank (2009), Towards a flexible pension scheme for self-employed workers NEA paper, Netspar

DellaVigna, S. (2009), "Psychology and Economics: Evidence from the Field." *Journal of Economic Literature*, 47 (2): 315-372.

DellaVigna, S. and Malmendier, U. (2004), "Contract Design and Self-Control: Theory and Evidence," *Quarterly Journal of Economics*, 119 (2004), 353-402.

DellaVigna, S. and U. Malmendier (2006), "Paying Not to Go to the Gym", *American Economic Review*, vol. 96, pp. 694-719.

Dinner, Isaac , and Daniel Goldstein (2010), Partitioning Default Effects: Why People Choose Not to Choose¹, paper presented at the Transforum Conference on Multiple Selves and Sustainability, Amsterdam, November

Eenkhoorn, Elizabeth and Gerrit Zijlmans (2010), Normen voor de Pensioenaansprakenstatistiek, *NEA paper* 29, Netspar Economische Adviezen

FNV (2007) *De Dynamische Driehoek, zzp'ers en de FNV*, February.

Frederick, Shane, George Loewenstein en Ted O'Donoghue (2002), Time Discounting and Time Preference: a Critical Review, *Journal of Economic Literature* XL (June)

Frijns, J.M.G., J.A. Nijssen and L.J.R. Scholtens (2010), Pension: 'Uncertain security', Investment Policy and Risk Management Committee An analysis of the investment policy and risk management of Dutch pension funds, Eindhoven/The Hague/Wognum

Gabaix, X., and Laibson, D. (2006), "Shrouded Attributes, Consumer Myopia, and

Rational Pensions for Irrational People

Information Suppression in Competitive Markets.” *The Quarterly Journal of Economics*, 121, 505-540.

Glimcher, Paul W., and Aldo Rustichini (2004), Neuroeconomics: The Consilience of Brain and Decision, *Science* (306), October

Goldstein, Daniel G., Eric J. Johnson, Andreas Herrmann, and Mark Heitmann (2008), Nudge Your Customers Toward Better Choices, *Harvard Business Review*

Gopi Shah Goda and Colleen Flaherty Manchester (2010), Incorporating Employee Heterogeneity Into Default Rules For Retirement Plan Selection, *Working Paper* Crr Wp 2010-6, Center for Retirement Research at Boston College/ NBER Working Paper No. 16099

Hall, Robert (2003) The Inkjet Aftermarket: An Economic Analysis, *Working Paper*, Stanford University, 2003

Huberman, G., S.S. Iyengar and W. Jiang (2004), How much choice is too much: Determinants of individual contributions in 401K retirement plans, in Mitchell, O.S. & Utkus, S.P (Eds.) *Pension Design and Structure: New Lessons From Behavioral Finance*, Oxford: Oxford University Press, 2004, pages 83-96.

Huberman, Gur, and Wei Jiang (2006), Offering versus Choice in 401(K) Plans: Equity Exposure and Number of Funds, *Journal of Finance* 61 (2), 763 – 801.

Iyengar, Sheena S. and Emir Kamenica (2010), Choice proliferation, simplicity seeking, and asset allocation, *Journal of Public Economics* 94, 530–539 v

Iyengar, S.S. en M.R. Lepper (2000), When choice is demotivating: can one desire too much of a good thing?, *Journal of Personality and Social Psychology* 79(6): 995-1006

Kahneman, D. and A. Tversky (1979), Prospect Theory: An Analysis of Decision Making under Risk, *Econometrica* 47 (1979), pp. 263-291

Kooreman, Peter and Henriëtte Prast (2010), What Does Behavioral Economics Mean for Policy? Challenges to Savings and Health Policies in the Netherlands, *De Economist* (forthcoming)

Lusardi, A., Mitchell, O.S., 2005. Financial Literacy and Planning: Implications for Retirement Wellbeing. DNB Working Paper, vol. 78

Madrian, Brigitte C. and Dennis F. Shea (2001), The Power of Suggestion: Inertia in 401(k) Participation and Savings Behavior, *The Quarterly Journal of Economics* Vol. CXVI November 2001 Issue 4

McClure, Samuel M., David I. Laibson, George Loewenstein and Jonathan D. Cohen (2004), Separate Neural Systems Value Immediate and Delayed Monetary Rewards, *Science* 15 October 2004 Vol. 306. no. 5695, pp. 503 - 507

Merton, Robert C. (2000), Future Possibilities in Finance Theory and Finance Practice, *Harvard Business School Working Paper*, No. 01-030, 2000

Merton, Robert C. (2006a), The Future of Personal Finance, *Keynote Address*, Conference on The Future of Life-Cycle Saving and Investing , Boston University School of Management, Boston, October 26

Rational Pensions for Irrational People

Merton, Robert C. (2006b), Observations on Innovation In Pension Fund Management In the Impending Future, *PREA Quarterly, Winter 2006*

Merton, Robert C. (2010), Solutions for the future, *Pension Insight*, February

Merton, Robert C. and Zvi Bodie (2005), Design of Financial Systems: Towards a Synthesis of Function and Structure, *Journal of Investment Management* 3(1), 1 – 23

Merton, R.C. and P.A. Samuelson (1974), Fallacy of the Log-Normal Approximation to Portfolio Decision-Making over Many Periods, *Journai of Financial Economics*, vol. 1, no. 1 (May):67-94

Morwitz, V.G., Greenleaf, E., Shalev, E. and Johnson, E. (2009) The Price does not Include Additional Taxes, Fees, and Surcharges: A Review of Research on Partitioned Pricing,

O'Donoghue, T., and Rabin, M. (1999), Doing It Now or Later, *American Economic Review* 89, 103-124.

Potters, J.J.M. and H.M. Prast (2009), Gedragseconomie in de praktijk, in Tiemeijer, Thomas en Prast (eds), *De menselijke beslisser- over de psychologie van keuze en gedrag*, WRR/Amsterdam University Press, The Hague/Amsterdam, pp 47 - 62

Prast, H.M. (2004), Psychology in Financial Markets: an Introduction to Behavioural Finance, Series *Financial Monetary Studies*, NIBE-SVV publishers, Amsterdam;

Prast, Henriëtte (2007). *Complexe producten: wat kunnen ze betekenen en wie moet ze begrijpen? Over financiële educatie en de verantwoordelijkheid van instituties*, De Nederlandsche Bank, Amsterdam

Prast, Henriette en Jan Snippe (2010) De kruik gaat zo lang te water tot zij barst, *NRC* 6 september

Rangel, Antonio, Colin Camerer and P. Read Montague (2008), A framework for studying the neurobiology of value-based decision making *Nature Reviews Neuroscience* 9, 545-556 (July)

Redelmeier, D. and E. Shafir (1995), *Medical decision making in situations that offer multiple alternatives*. *Journal of the American Medical Association*, 273, 4, 302-305

Samuelson, Paul A. (1937), A note on measurement of utility, *The Review of Economic Studies*, Vol. 4, No. 2, pp. 155-161

Samuelson, P.A. (1963) Risk and Uncertainty: A Fallacy of Large Numbers, *Scientia*, 6th series, 57th year (April /May 1963):1-6;

Samuelson, P.A. (1989). "The Judgement of Economic Science on Rational Portfolio Management: Timing and Long-Horizon Effects," *The Journal of Portfolio Management*, vol. 16, no. 1 (Fall 1989):4-12;

Samuelson, P.A. (1994) "The Long-Term Case for Equities and How It Can Be Oversold," *The Journai of Portfolio Management*, vol. 21, no. 1 (Fall 1994): 15-24.

Samuelson, Paul (1997), Dogma of the Day, Invest for the long term, the theory goes, and the risk lessens, *Bloomberg Personal Finance Magazine*, January/February 1997

Rational Pensions for Irrational People

Samuelson, Paul (2006), Is Personal Finance a Science? keynote Address, The Future of Life Cycle Saving and Investing, Boston University, Boston, 25 October

Rational Pensions for Irrational People

Samuelson, W. and R. Zeckhauser (1988), –Status quo bias in decision making.|| *Journal of Risk and Uncertainty*

Schwartz, Barry (2004), *The Paradox of Choice: Why More Is Less*, Ecco, 2004.

Shafir, Eldar, Peter Diamond and Amos Tversky (1997), Money Illusion, *Quarterly Journal of Economics* Vol. 112, No. 2, Pages 341-374

Simon, Herbert (1955), A Behavioral Model of Rational Choice, *Quarterly Journal of Economics* 99, 103 – 110

Smetters, Ken, and Ben Lin (2010), Elastic Option Overlays, *White Paper*

Stewart, S (2005), Can behavioral economics save us from ourselves?, *The University of Chicago Magazine* 97 (3)

Stichting van de Arbeid (2010), *Pensioenakkoord 2010*, June 4

Stigler, George (1961), The Economics of Information, *Journal of Political Economy* Vol. LXIX (3)

Thaler, R.H. and S. Benartzi (2004), "Save More Tomorrow: Using Behavioral Economics to Increase Employee Saving", *Journal Political Economy*, vol. 112, pp. S164-S187.

Thaler, R. and H. Shefrin (1981), An Economic Theory of Self-Control, *Journal of Political Economy* 89 (2), pp. 392-410

Thomas, M. and V. Morwitz (2007) Heuristics in Numerical Cognition: Implications for Pricing, *Handbook of Pricing Research in Marketing*, Edward Elgar

Tversky, Amon and Eldar Shafir (1992), Choice under conflict: The dynamics of deferred decision. *Psychological Science*, 3, 6, 358-361.

Van der Lecq, Fieke, and Alwin Oerlemans (2009) Zelfstandigen zonder pensioen, *NEA paper* 24, Netspar

Van Els, P.J.A., M.C.J. van Rooij, and M.E.J. Schuit (2007), Why mandatory retirement saving?, in: O.W. Steenbeek and S.G. van der Lecq (eds.), *Costs and benefits of collective pension systems*, Springer, Berlin, 159-186

Van Rooij, M.C.J. van, C.J. Kool and H.M. Prast (2007), Risk-return preferences in the pension domain: are people able to choose? *Journal of Public Economics*

Willis, Lauren E. (2008), Against Financial Literacy Education, *Iowa Law Review*, Vol. 94; *U of Penn Law School*, *Public Law Research Paper No. 08-10*; *Loyola-LA Legal Studies Paper No. 2008-13*